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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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49455	7590	09/06/2006	EXAMINER	
STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005			CHOW, LIXI	
			ART UNIT	PAPER NUMBER
			2627	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/806,106	AHN ET AL.	
	Examiner	Art Unit	
	Lixi Chow	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. Claims 1-3 and 5-26 are pending in this application.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/15/06 has been entered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3 and 8-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 recites in part, "a power level of a pulse between an end the erase pattern and a start point of the recording pattern..." However, this limitation is ambiguous as to whether such pulse can exist. Essentially, the end point of the erase pattern is the beginning point of the recording pattern. Also, it is not clear as to whether the "pulse between an end point of the erase pattern and a start point of the recording pattern" belongs to the portion of the erase pattern or to the portion of the recording pattern. In contrast, Applicant does in fact disclose a time period (Tsfp) from a point where the NRZI data is transitioned from a low level to high level at the point when the first pulse constituting the recording pattern starts. However, as indicated in the Applicant's disclosure, Tsfp is a period, not a pulse. Therefore, the subject matter in claim 1 is indefinite.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 8-10, 15, 17, 19, 20 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Dekker (US Pub. No. 2002/0003762).

Regarding claim 1:

Dekker discloses a method of recording data on an optical recording medium, the method comprising:

generating channel modulated digital data (see Fig. 3, element 63 is a pattern generator generates channel modulated digital data from the information signal 10);

generating a recording waveform having an erase pattern (see Fig. 1A, erase pulses 14) containing a multi-pulse of pulses having corresponding low and high powers (see Fig. 1A), and a recording pattern in response to the channel modulated digital data (see Fig. 1A, write pulses 13); and

forming a first level of the channel modulated digital data as a mark and forming a second level of the channel modulated digital data as a space by using the generated recording waveform (see Fig. 1A, the high period 11 records mark, and the low period 12 form space);

wherein the generating the recording waveform comprises causing a power level of a pulse/period between an end of the erase pattern and a start point of the recording pattern to be

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the high level of the multi-pulse and a power level of a leading pulse of the erase pattern to be the low level or the high level of the multi-pulse (see Fig. 1A, the period between the end point of the erase pulses 14 and start point of the recording pattern is at high power level P1; as shown in the figure, power level P1 is higher than power level at the leading portion of the erase pulses 14).

Regarding claims 8-10

Dekker discloses the method, wherein the generating of the recording waveform comprises:

causing a ratio of a duration time of a high level and another duration time of a low level of the multi-pulse to be substantially 1:1 and/or m:n wherein m and n are integers; causing the duration time of the high level to be half a clock cycle (see Fig. 1A; at least one of high level duration and low level duration time corresponds to 1:1 and/or m:n).

Regarding claim 15:

Dekker discloses the method, wherein the generating of the recording waveform comprises:

forming the recording pattern having at least two power levels (see Fig. 1A, write pulses 13 have power level Pw and P1).

Regarding claim 17:

Dekker discloses the method, wherein:

the recording pattern contains another multi-pulse adjacent to the erase pattern (write pulses 13 is a multi-pulse), and the generating the recording waveform further comprises adjusting a first pulse of the another multi-pulse according to a property of the trailing pulse (see

Fig. 1A, the leading pulse of the another write pulses 13 is adjusted in the same manner as the trailing pulse of the erase pulses 14).

Regarding claim 19:

Dekker discloses the method, wherein the power of the leading pulse of the erase pattern is other than the power of the first one of the multi-pulses of the recording pattern (see Fig. 1A; power P1 is above the power level of the leading pulse of the erase pattern).

Regarding claim 20:

Dekker discloses the method, wherein the multi-pulse of the recording pattern further comprises a recording pulse having a recording power greater than the power of the first one of the pulses of the recording pattern (see Fig. 1A; power Pw is greater than P1).

Regarding claim 22:

Dekker discloses the method, wherein the generating of the recording waveform further comprises forming the recording pattern using a multi-pulse (write pulses 13 is a multi-pulse), a first one of the multi-pulses of the recording pattern having a power that is greater than or equal to the power of leading pulse of the erase pattern (see Fig. 1A; P1 is greater than the power level of leading pulse of the erase pattern).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 2, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of McLaughlin (US 6,150,964). For a description of Dekker, see the rejection of paragraph 6, above.

Regarding claims 2 and 11:

Dekker fails to disclose the method, wherein recording data according to a RLL (2, 10) method, and/or recording data according to NRZI data signal. However, McLaughlin discloses a method comprising: recording data according to a Run Length Limited (RLL) (2, 10) method (see col. 1, lines 9-14); and recording a first level of a Non Return to Zero Inverted (NRZI) data signal as a mark and a second level of the NRZI data signal as the space (see col. 4, lines 7-20).

It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the method of recording mark and/or space of Dekker, so that the data is recorded according to RLL (2,10) method and/or NRZI data signal as suggested by McLaughlin. One would have been motivated to do this, because method for coding data using RLL (2, 10) is particularly useful for storing and/or transmitting multi-level data (see col. 1, lines 9-14). Hence, mark and space can be accurately recorded onto the optical recording medium.

Regarding claim 12:

Dekker disclose the method, wherein the generating of the recording waveform comprises:

forming a cooling pulse as a part of the erase pattern (see Fig. 1A; cooling pulse is the pulse connecting the write pulses 13 and the erase pulses 14).

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9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of Clark et al. (US 5,802,031; hereafter Clark). For a description of Dekker, see the rejection of paragraph 6, above.

Regarding claim 3:

Dekker does not disclose the data recorded using the waveform modulated according to a Run Length Limited (RLL) (1,7). However, Clark discloses the recording of data using the waveform modulated according to a Run Length Limited (RLL) (1,7) (see Clark, col. 6, lines 51-59).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted the method of recording data according to a Run Length Limited (RLL) (1,7) in the medium of Dekker as taught by Clark. One of ordinary skill in the art would have been motivated to do this, because recording of marks and spaces of length 2T to 8T for standard M-O recording system is possible (see Clark, col. 6, lines 51-59). Hence, recording of marks or spaces amongst different types of recording format can be achieved.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno et al. (US 5,150,351; hereafter Ohno) in view of Nakamura et al. (US 6,280,810; hereafter Nakamura).

Regarding claim 7:

Ohno discloses a method of recording data on an optical recording medium, the method comprising:

generating channel modulated digital data (see Fig. 4(b);

generating a recording waveform having an erase pattern containing a multi-pulse of pulses having corresponding low and high powers, and a recording pattern in response to the

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channel modulated digital data (see Fig. 4(b); multi-pulse erase pattern comprises of power level P_b and P_r); and

forming a first level of the channel modulated digital data as a mark and forming a second level of the channel modulated digital data as a space by using the generated recording waveform (see col. 4, lines 21-39),

wherein the generating of the recording waveform comprises:

causing a power level of a leading pulse of the erase pattern to be a same level of the multi-pulse as a power level of a trailing pulse of the multi-pulse (see Fig. 4(b)).

Ohno fails to disclose that the power level of the leading pulse and/or the trailing pulse of the erase pattern is above a cooling level of the recording and/or erase pattern. However, Nakamura discloses a method, wherein the recording pattern further comprises a cooling pulse concatenating the recording and erase patterns and having a cooling power less than the power level of the erase pattern (see Fig. 8A or 8B; pulse T3 or T4 is the cooling pulse having power less than the power of record and erase pulse).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Dekker, such that the cooling pulse has power level below recording and erase pulse as taught by Nakamura. One of ordinary skill in the art would have been motivated to do this, because a cooling pulse provides rapid cooling of the recording layer, so as to form a clear boundary of the write mark at the front/back edge in the recording layer (see col. 15, lines 27-33).

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11. Claims 16, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dekker in view of Nakamura et al. (US 6,280,810; hereafter Nakamura). For a description of Dekker, see the rejection of paragraph 6, above.

Regarding claims 16, 21 and 25:

Dekker does not, but Nakamura discloses a method, wherein the recording pattern further comprises a cooling pulse concatenating the recording and erase patterns and having a cooling power less than the power of the first pulse of the recording pattern and the low power level of the erase pattern; and/or the cooling pulse having a power level below the low level (see Fig. 8A or 8B; pulse T3 or T4 is the cooling pulse having power less than the power of record and erase pulse).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Dekker, such that the cooling pulse has power level below recording and erase pulse as taught by Nakamura. One of ordinary skill in the art would have been motivated to do this, because a cooling pulse provides rapid cooling of the recording layer, so as to form a clear boundary of the write mark at the front/back edge in the recording layer (see col. 15, lines 27-33).

12. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno in view of Furumiya.

Regarding claim 26:

Ohno discloses a method of recording data on an optical recording medium, the method comprising:

generating channel modulated digital data (see Fig. 4(b);

generating a recording waveform having an erase pattern containing a multi-pulse of pulses having corresponding low and high powers, and a recording pattern in response to the channel modulated digital data (see Fig. 4(b); multi-pulse erase pattern comprises of power level P_b and P_r); and

forming a first level of the channel modulated digital data as a mark and forming a second level of the channel modulated digital data as a space by using the generated recording waveform (see col. 4, lines 21-39),

wherein the generating of the recording waveform comprises causing a power level of a leading pulse of the erase pattern to be low power of the multi-pulse (see Fig. 4(b); leading pulse of the erase pattern has power level P_r).

Ohno fails to disclose a power level between an end of the erase pattern and a start point of a leading pulse of the recording pattern to be the low power level of the multi-pulse. However, Furumiya discloses a method of recording data on an optical recording medium, wherein the power level between an end of the erase pattern and a start point of a leading pulse of the recording pattern to be a lower power of the multi-pulse (see Fig. 1(b)).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Ohno, so that the power level between an end of the erase pattern and a start point of the recording pattern is a low power level of the multi-pulse as taught by Furumiya. One of ordinary skill in the art would have been motivated to do this, because the occurrence of the edge shift caused by thermal interference across a shorter space in recording, the nonlinearity of a short mark, and the equalization characteristics during recording can be compensated for (see col. 2, line 65 to col. 3, line 2).

13. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno in view of Furumiya, and further in view of Nakamura.

Regarding claim 6:

Claim 6 recites similar limitations as claim 26; hence claim 6 is rejected under the similar reasons set forth above in regards to claim 26. In addition, claim 6 also recites the low level is greater than a cooling level of the recording and/or erase pattern. Ohno and Furumiya do not, but Nakamura disclose the low level is greater than a cooling level of the recording and/or erase pattern (see Fig. 8A or 8B; pulse T3 or T4 is the cooling pulse having power less than the power of record and erase pulse).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the recording waveform of Dekker, such that the cooling pulse has power level below recording and erase pulse as taught by Nakamura. One of ordinary skill in the art would have been motivated to do this, because a cooling pulse provides rapid cooling of the recording layer, so as to form a clear boundary of the write mark at the front/back edge in the recording layer (see col. 15, lines 27-33).

Response to Arguments

14. Applicant's arguments with respect to claims 1-3 and 6-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. No comments will be made in this Office Action regarding the allowability of claims 13, 14, 18, 23 and 24 due to the rejection under the 35 U.S.C 112, 2nd paragraph.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lixi Chow whose telephone number is 571-272-7571. The examiner can normally be reached on Mon-Fri, 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, A. L. Wellington can be reached on 571-272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LC 8/31/06


ANDREA WELLINGTON
SUPERVISORY PATENT EXAMINER